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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,820	10/24/2003	Chester Ledlie Sandberg	5659-20900/EBM	1426

7590 01/03/2012

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ART UNIT	PAPER NUMBER
3742	

MAIL DATE	DELIVERY MODE
01/03/2012	PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHESTER LEDLIE SANDBERG,
HAROLD J. VINEGAR, CHRISTOPHER KELVIN HARRIS,
JAIME SANTOS SON and
FREDERICK GORDON CARL JR.

Appeal 2010-001121
Application 10/693,820
Technology Center 3700

Before LINDA E. HORNER, JOHN C. KERINS and
STEVEN D.A. McCARTHY, *Administrative Patent Judges*.

McCARTHY, *Administrative Patent Judge.*

DECISION ON APPEAL

The Appellants appeal under 35 U.S.C. § 134 from the Examiner's rejection of claims 1691-96, 1698-1716, 1718-34 and 1736-53. Claims 1-1690, 1697, 1717 and 1735 are cancelled. We have jurisdiction under 35 U.S.C. § 6(b).

The Examiner finally rejects claims 1691-96, 1699-1716, 1719-34 and 1736-53 under 35 U.S.C. § 103(a) as unpatentable over Eastlund (US 4,716,960, issued Jan. 5, 1988); either Van Egmond (US 5,065,818, issued Nov. 19, 1991) or Bell (US 4,382,469, iss. May 10, 1983); and Rose (EP 0 130 671 A2, pub. Jan. 9, 1985).

The Examiner also finally rejects claims 1698 and 1718 under § 103(a) as unpatentable over Eastlund; either Van Egmond or Bell; Rose; and Bridges (CA 2,152,521, issued Jun. 20, 2000).

The Examiner provisionally rejects claims 1691-96, 1698-1716, 1718-34 and 1736-53 for non-statutory obviousness-type double patenting as unpatentable over one or more claims of Sandberg '700 (US Appl'n 10/693,700, filed Oct. 24, 2003, pub. Jan. 13, 2005 as US 2005/0006097 A1) or of Sandberg '840 (US Appl'n 10/693,840, filed Oct. 24, 2003, pub. Jul. 22, 2004 as US 2004/0140096 A1).

We REVERSE the final rejections of claims 1691-96, 1698-1716, 1718-34 and 1736-53. We do not reach the provisional rejection of these claims.

Claims 1691, 1711 and 1731 are independent. Claim 1691 recites:

> 1691. A system configured to heat a hydrocarbon containing formation, comprising:
>
> a heater well extending from a surface of the earth through an overburden of the formation and into a hydrocarbon containing layer in the formation;

> an AC supply configured to provide AC at a voltage above about 200 volts; and
>
> one or more electrical conductors located in the heater well and extending from the surface into the hydrocarbon containing layer, the electrical conductors being electrically coupled to the AC supply;
>
> at least one electrical conductor comprising one or more ferromagnetic sections, and being configured to provide an electrically resistive heat output during application of AC to the electrical conductor such that heat transfers from the electrical conductor to hydrocarbons in the hydrocarbon containing layer to at least mobilize some hydrocarbons in the layer;
>
> wherein one or more of the ferromagnetic sections provides a reduced amount of heat above or near a selected temperature during use, wherein the selected temperature is at or about the Curie temperature of the ferromagnetic section.

Claim 1691 and 1711 each recite a system including one or more electrical conductors located in the heater well and extending from the surface and into the hydrocarbon containing layer. At least one of the electrical conductors is "configured to provide an electrically resistive heat output during application of AC to the electrical conductor such that heat transfers from the electrical conductor to hydrocarbons in the hydrocarbon containing layer to at least mobilize some hydrocarbons in the layer." The latter recitation limits the system to one including an electrical conductor which not only heats hydrocarbons which originated in the hydrocarbon containing formation, but also heats the hydrocarbons while the hydrocarbons are in the formation. This interpretation is consistent with the disclosure of the Specification.

An interpretation of the recitation broad enough to encompass heating hydrocarbons which originated in the hydrocarbon containing formation

only while the hydrocarbons are outside the formation would be inconsistent with the preamble of each of claims 1691 and 1711, that is, with a system "configured to heat a hydrocarbon containing formation." Such an interpretation also would be inconsistent with the recitation that the heating is "to at least mobilize some hydrocarbons in the layer." (*Cf.* App. Br. 9 (arguing that "Eastlund only teaches the heating of fluids that have **already** been mobilized and have moved into the well tubing through perforations 12 (Figure 1) or perforations 113 (Figure 7A).").)

Claim 1731 recites a method of heating a hydrocarbon containing formation. The method includes "allowing heat to transfer from the electrical conductors to hydrocarbons in the hydrocarbon containing layer to at least mobilize some hydrocarbons in the layer." For reasons similar to those discussed in the last paragraph of this opinion *infra*, this step is limited to allowing heat to transfer from the electrical conductors to hydrocarbons while the hydrocarbons are in the hydrocarbon containing layer.

Eastlund describes a well having an upper tubing section *13a* and a lower tubing section *13b* suspended in a casing *10*. (Eastlund, col. 3, ll. 20-24.) A lead *19* electrically connects a power source with the lower tubing section *13b*. (Eastlund, col. 3, ll. 64-68.) Another lead *21* electrically connects the power source with a wellhead. (Eastlund, col. 4, ll. 6-7.) The casing *10* is secured to the wellhead. (Eastlund, col. 3, ll. 13-15.) A "scratcher" *17* electrically connects the lower tubing section *13b* and the casing *10* to complete an electrical circuit at and above the scratcher *17*. (Eastlund, col. 3, ll. 55-63.)

Eastlund teaches using an electrical circuit to heat the tubing to prevent solids such as paraffin from depositing within the tubing. (Eastlund,

col. 4, ll. 22-25). Eastlund teaches connecting the casing *10* and the lower tubular section *13b* below the normal level of solids formation in the tubing. (Eastlund, col. 3, ll. 40-54.) Nevertheless, Figure 1 of Eastlund implies that the scratcher *17* defines the lowest extent of the electrical circuit significantly above the hydrocarbon containing formation as indicated by the casing perforations *12*. (*See* Eastlund, col. 3, ll. 17-19.) The Examiner does not provide a sound, non-conclusory basis for finding that the electrical circuit is capable of heating hydrocarbons while in the hydrocarbon containing formation. (*See generally* Ans. 3 and 7-8; *see also* App. Br. 9-11.)

Van Egmond describes a heater "particularly useful in enhanced recovery of heavy oils from oil bearing strata, and in recovery of hydrocarbons from oil shales." (Van Egmond, col. 2, ll. 6-8.) The heater includes heating cables *1*, *2*. (*See* Van Egmond, col. 3, ll. 35-37.) Figure 1 of Van Egmond depicts the cables *1*, *2* as extending from the surface to heat a subterranean zone 2 located below the overburden. (*See* Van Egmond, col. 3, ll. 32-34.)

Bell teaches a method for producing fuel gas from an underground formation of carbonaceous material. The method includes contacting the carbonaceous material with an aqueous electrolyte and passing a controlled amount of direct current through the formation to produce the gas by electro-chemical action. (Bell, col. 2, l. 54 – col. 3, l. 2.)

The Examiner concludes that:

> it would have been obvious . . . to adapt Eastlund with the heater well that extends through an overburden formation and into the hydrocarbon containing formation at least about 10 m or more to effectively heat such hydrocarbon containing layer.

(Ans. 4.) Eastlund's electrical circuit is designed to heat and mobilize hydrocarbons within the tubing, however. Eastlund's circuit is not designed to heat and mobilize hydrocarbons in a hydrocarbon containing formation as claimed. The adaptation that the Examiner proposes would require adapting Eastlund's circuit to address a problem for which the circuit was not designed. Van Egmond and Bell describe different systems for addressing different problems. The Examiner's reasoning does not persuade us that the teachings of either Van Egmond or Bell would have provided one of ordinary skill in the art reason to try to adapt an electrical circuit such as that described by Eastlund to heat hydrocarbons in a hydrocarbon containing formation. (*See* App. Br. 12.)

The Examiner correctly finds that Rose describes "a heating element having an inner core made of copper with an outer conductor made of a ferromagnetic carbon steel which allows the heating element to be self-regulating." (Ans. 4; *see* Rose 9, ll. 1-18.) Rose does not appear to suggest use of the heating element for heating hydrocarbons in a hydrocarbon containing formation. Therefore, Rose does not remedy the deficiencies in the combined teachings of Eastlund with Van Egmond or Bell. We thus do not sustain the rejection of claims 1691-96, 1699-1716, 1719-34 and 1736-53 under § 103(a) as unpatentable over Eastlund; Van Egmond or Bell; and Rose.

Bridges describes a heating system for delivering electric power to a hydrocarbon-containing reservoir in a production well. (*See* Bridges 13, l. 12 – 14, l. 6.) Bridges also teaches that a three-phase power supply may be used to supply electrical power for the heating system. (*See* Bridges 12, l. 16 – 13, l. 11.) The Examiner cites Bridges solely for the latter teaching.

(*See* Ans. 6.) The Examiner does not adequately explain how the teachings of Bridges might remedy the deficiencies in the combined teachings of Eastlund; either Van Egmond or Bell; and Rose as discussed with respect to the rejections of independent claims 1691, 1711 and 1731. (*See* App. Br. 24.) We thus do not sustain the rejection of claims 1698 and 1718 under § 103(a) as unpatentable over Eastlund; Van Egmond or Bell; Rose and Bridges.

The Examiner also provisionally rejects appealed claims 1691-96, 1698-1716, 1718-34 and 1736-53 for non-statutory obviousness-type double patenting as unpatentable over one or more claims of Sandberg '700 or of Sandberg '840. The Appellants do not contest this rejection. Instead, the Appellants represent that they will provide a terminal disclaimer once the application underlying this appeal is in condition for allowance. (*See* App. Br. 24.) Based on this representation, we do not reach the provisional rejection. Nevertheless, we note that Sandberg '700 and Sandberg '840 appear to have the same filing date as the application underlying this appeal. We direct the Examiner's attention to the second paragraph of § 804 I.B.1. of the MANUAL OF PATENT EXAMINING PROCEDURE ("MPEP").

DECISION

We REVERSE the Examiner's decision finally rejecting claims 1691-96, 1698-1716, 1718-34 and 1736-53.

We do not reach the Examiner's decision provisionally rejecting claims 1691-96, 1698-1716, 1718-34 and 1736-53.

REVERSED

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